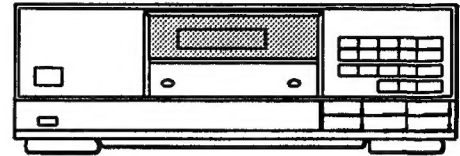


AIWA®**DX-D91**

SERVICE MANUAL



COMPACT DISC PLAYER

• BASIC CD MECHANISM : KSL - 150ACM3

• TYPE. Y,YK

- ◆ DX-D91 is the Compact Disc Player
which is connected to MX-D91/D86 only.

SPECIFICATIONS

Type:	Compact disc digital audio system
Disc:	Compact disc
Scanning method:	Non contact optical scanner (semiconductor laser application)
Laser:	Semiconductor laser ($\lambda=780$ nm)
Rotation speed:	Approx. 500 rpm - 200 rpm (CLV) Approx. 900 rpm - 360 rpm (CLV) (at high speed) (only when connected to the FX-W919 or FX-W868 cassette deck)
Error correction:	Cross Interleave, Reed Solomon code
No. of channels:	2 channel
D-A conversion:	16-bit linear
Wow/Flutter:	Unmeasurable
Dimensions:	360 (W) \times 118 (H) \times 304 (D) mm
Weight:	3.4 kg
Frequency response:	10 Hz - 20 kHz, ± 1 dB
Harmonic distortion:	0.015% (1 kHz, 0 dB)
Dynamic range:	92 dB
Channel separation:	84 dB (1 kHz, 0 dB)
S/N ratio:	96 dB (1 kHz)

• Design and specifications are subject to change without notice.

AIWA Co., Ltd.**Tokyo Japan**

CAUTIONS WHEN SERVICING

The DX-D91 has no power supply circuit. Power should be supplied from MX-D91,D86 using an 11-core flat cable. During repair, connect DX-D91 to the MX-D91,D86 to supply the power. When there is no MX-D91,D86, supply the power in the manner below.

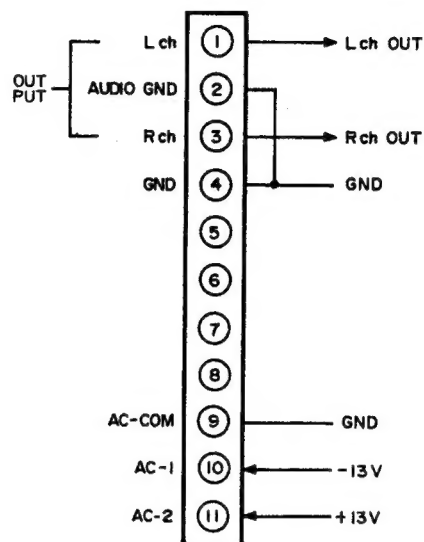
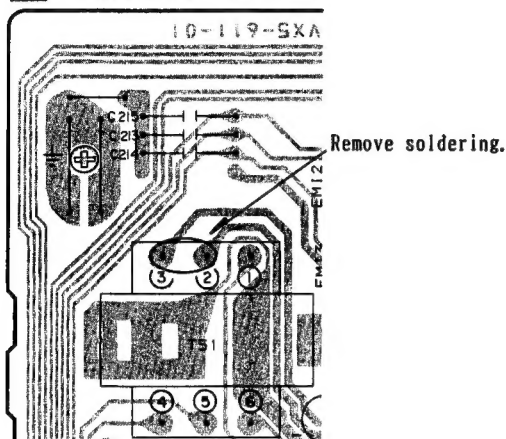
(When repairing without MX-D91,D86)

1. Remove soldering from ② and ③ terminals of T51 not to flow DC through T51.
2. Connect the Multi-Power Supply(LPS-9088) in the manner below.

• FL51 does not light, as AC power for FL51 is not supplied.

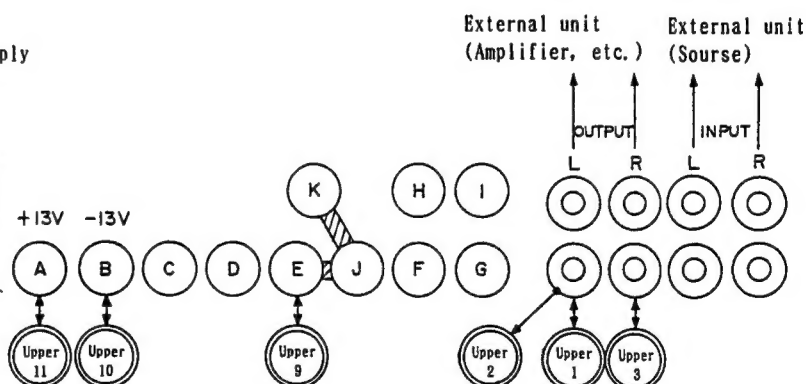
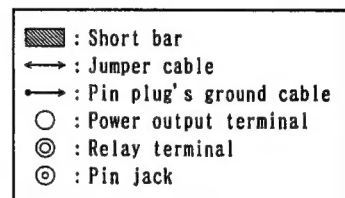
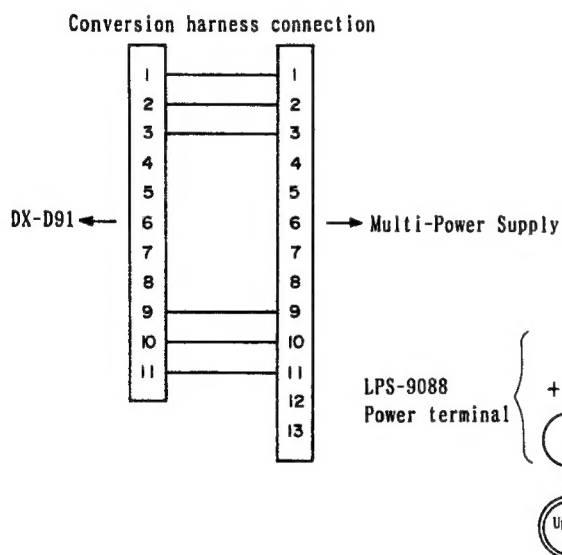
The voltages below are supplied to each CON101 terminal from the external power source.

A MAIN C.B



3. Multi-Power (LPS-9088) Connection

Connect to J1 of the LPS-9088 using a multi-conversion harness.



ACCESSORIES/PACKAGE LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1	★89-VX5-904-019	INSTRUCTION BOOKLET (Y)	※	1
	2	★89-VX5-914-018	INSTRUCTION BOOKLET (Y, YK)	※	1

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs laser. Therefore, be sure to follow carefully the instructions below when servicing.

WARNING!!

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

CAUTION

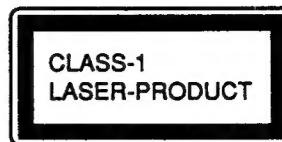
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

ATTENTION

L'utilisation de commandes, réglages ou procédures autres que ceux spécifiés peut entraîner une dangereuse exposition aux radiations.

"Varoitus! Suojakotelo ei saa avata. Laite sisältää laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilyä."

This Compact Disc player is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT label is located on the rear exterior.



ADVARSEL!



Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

"Denna apparat innehåller laserkomponent som avger laserstrålning som överskrider gränsen för laserklass 1."

DISASSEMBLY INSTRUCTIONS

1. "Tray" Removal

- 1) Remove the "Cabinet, Steel".
- 2) ● For AUTOMATIC operation
Press the OPEN/CLOSE button to eject the "Tray".
- For MANUAL operation
Insert a flat-head screwdriver into the hole at the bottom of the set and turn the cam in the direction of the arrow to eject the "Tray". (See Figure-1)
- 3) Remove "MAIN C.B" and loosen 2 screws ② and pull out the "Tray" toward you. (See Figure-2)

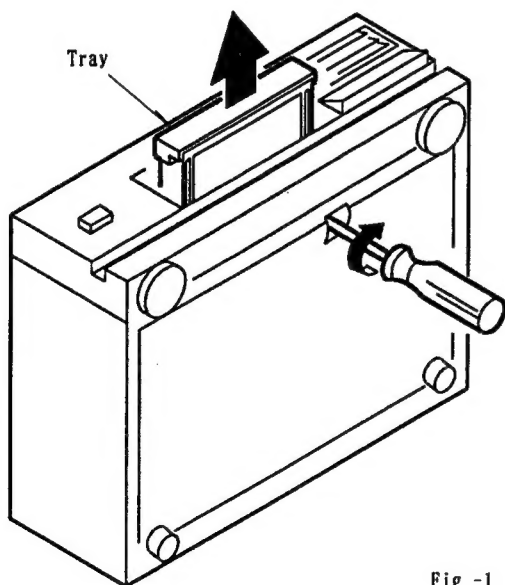


Fig. -1

2. "CD Mechanism" Removal

- 1) Remove 4 screws ① and remove "MAIN C.B".
- 2) Loosen 2 screws ②, remove 3 screws ③ and remove "CD Mechanism". (See Figure-2)

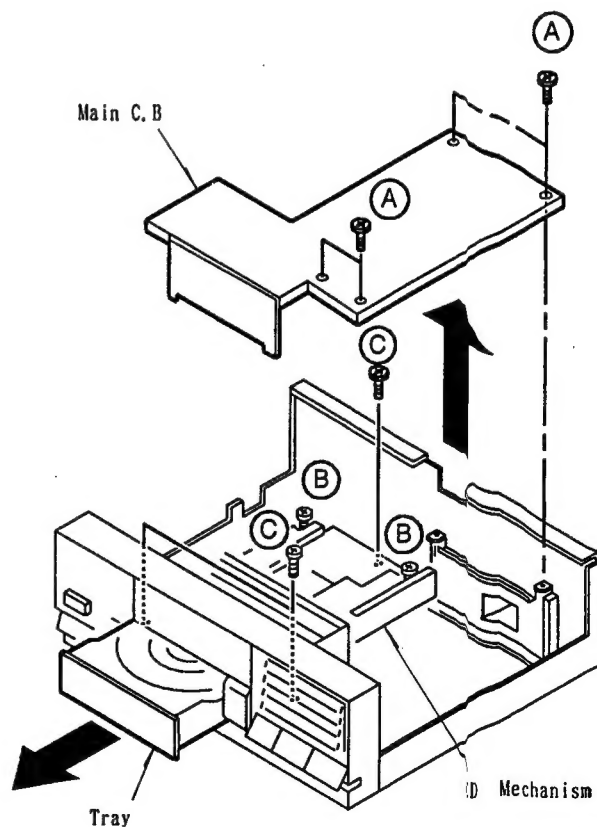


Fig. -2

ELECTRICAL MAIN PARTS LIST

REF. NO. PART NO. DESCRIPTION

===IC===

87-001-184-010 IC, CXA1081S
87-020-794-010 IC, CXA1082BQ
87-020-795-010 IC, CXD1135Q
87-001-888-010 IC, CXK5816PN-12L

89-VX5-615-010 IC, CXP5058H-554Q
87-001-561-019 IC, HD74HC02P(Y)
87-001-196-019 IC, ICPN10
87-001-132-019 IC, ICPN38

87-001-173-019 IC, LA6510
87-027-895-019 IC, M5218L
87-020-619-019 IC, M5238L
87-020-758-019 IC, NJM2068SD(Y)

87-027-986-019 IC, NJM4560SA
87-020-881-019 IC, NJM78L05A
87-001-169-010 IC, STA341M
87-001-865-010 IC, TDA1543A

===TRANSISTOR===

89-110-154-019 TRANSISTOR, 2SA1015Y
89-112-964-019 TRANSISTOR, 2SA1296Y
89-213-702-019 TRANSISTOR, 2SB1370E
89-318-155-019 TRANSISTOR, 2SC1815GR

89-318-154-019 TRANSISTOR, 2SC1815Y
89-320-011-019 TRANSISTOR, 2SC2001K
89-420-612-019 TRANSISTOR, 2SD2061E
87-026-216-019 TRANSISTOR, DTA124ES

87-026-217-019 TRANSISTOR, DTC124ES
87-026-218-019 TRANSISTOR, DTC144ES

===DIODE===

87-027-376-019 DIODE 1B4B41
87-027-975-019 DIODE 1S1588
87-001-559-019 DIODE 1SS131
87-020-110-019 DIODE 1SS177

87-027-451-019 DIODE, ZENER HZ27-2L
87-001-566-019 DIODE, ZENER HZ2B-1
87-027-332-019 DIODE, ZENER HZ6B1L

===MAIN CIRCUIT BOARD SECTION===

C1 *87-010-262-019 CAP, ELECT 3300-16V SME
C2 *87-015-997-019 CAP, ELECT 2200-16V SME
C3 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y
C4 *87-010-384-019 CAP, ELECT 100-25V SME

C5 *87-010-384-019 CAP, ELECT 100-25V SME
C51 *87-010-247-019 CAP, ELECT 100-50V SME
C53 *87-010-405-019 CAP, ELECT 10-50V SME
C54 *87-010-382-019 CAP, ELECT 22-25V SME

C55 *87-010-382-019 CAP, ELECT 22-25V SME
C101 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B
C102 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B
C103 *87-018-205-019 CAP, CERA-SOL U 0.022-25 F(Y)

C104 *87-018-205-019 CAP, CERA-SOL U 0.022-25 F(Y)
C107 *87-010-405-019 CAP, ELECT 10-50V SME
C108 *87-010-405-019 CAP, ELECT 10-50V SME
C111 *87-014-039-019 CAP, PP 180P-100 J

C112 *87-014-039-019 CAP, PP 180P-100 J
C113 *87-010-263-019 CAP, ELECT 100-10V
C114 *87-010-263-019 CAP, ELECT 100-10V
C115 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y

C116 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y
C117 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B
C118 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B
C120 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F

C121 *87-010-248-019 CAP, ELECT 220-10V SME
C122 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F(Y)
C123 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B
C151 *87-010-374-019 CAP, ELECT 47-10V

REF. NO. PART NO. DESCRIPTION

C152 *87-010-374-019 CAP, ELECT 47-10V
C201 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y
C202 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y
C203 *87-010-374-019 CAP, ELECT 47-10V

C204 *87-010-404-019 CAP, ELECT 4.7-50V SME
C205 *87-018-127-019 CAP, CERA-SOL U 470P-50 B
C206 *87-018-127-019 CAP, CERA-SOL U 470P-50 B
C207 *87-018-127-019 CAP, CERA-SOL U 470P-50 B

C208 *87-018-127-019 CAP, CERA-SOL U 470P-50 B
C209 *87-018-127-019 CAP, CERA-SOL U 470P-50 B
C210 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y
C211 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F

C212 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B
C213 *87-018-131-019 CAP, CERA-SOL U 100P-50 B
C214 *87-018-119-019 CAP, CERA-SOL U 100P-50 B
C215 *87-018-119-019 CAP, CERA-SOL U 1000P-50 B

C301 *87-010-545-019 CAP, ELECT 0.22-50V SME(Y)
C303 *87-018-097-019 CAP, CERA-SOL 2.2P(Y)
C304 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F(Y)
C307 *87-018-149-019 CAP, CERA-SOL U 15P-50 CH(Y)

C309 *87-018-150-019 CAP, CERA-SOL U 18P-50 CH(Y)
C310 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B(Y)
C311 *87-018-114-019 CAP, CERA-SOL U 39P-50 SL(Y)
C312 *87-018-111-019 CAP, CERA-SOL U 27P-50 SL(Y)

C313 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y(Y)
C314 *87-010-374-019 CAP, ELECT 47-10V(Y)
C315 *87-018-131-019 CAP, CERA-SOL U 1000P-50 B(Y)
C316 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F(Y)

C317 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F(Y)
C320 *87-018-119-019 CAP, CERA-SOL U 100P-50 B(Y)
C351 *87-010-374-019 CAP, ELECT 47-10V
C352 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y

C353 *87-018-114-019 CAP, CERA-SOL U 39P-50 SL(Y)
C353 *87-018-113-019 CAP, CERA-SOL U 33P(YK)
C354 *87-018-111-019 CAP, CERA-SOL U 27P-50 SL(Y)
C354 *87-018-113-019 CAP, CERA-SOL U 33P(YK)

C355 *87-010-400-019 CAP, ELECT 0.47-50V SME
C357 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y
C358 *89-018-104-019 CAP, CERA-SOL U 10P
C359 *89-018-104-019 CAP, CERA-SOL U 10P

C360 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F
C401 *87-018-132-019 CAP, CERA-SOL U 2200P-16 X
C402 *87-018-134-019 CAP, CERA-SOL U 0.01-16 Y
C404 *87-018-205-019 CAP, CERA-SOL U 0.022-25 F

C408 *87-010-404-019 CAP, ELECT 4.7-50V SME
C410 *87-010-545-019 CAP, ELECT 0.22-50V SME
C411 *87-010-404-019 CAP, ELECT 4.7-50V SME
C413 *87-010-401-019 CAP, ELECT 1-50V SME

C414 *87-010-404-019 CAP, ELECT 4.7-50V SME
C415 *87-018-133-019 CAP, CERA-SOL U 4700P-16 X
C416 *87-010-382-019 CAP, ELECT 22-25V SME
C417 *87-010-263-019 CAP, ELECT 100-10V

C418 *87-010-263-019 CAP, ELECT 100-10V
C422 *87-018-205-019 CAP, CERA-SOL U 0.022-25 F
C423 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F
C424 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F

C425 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F
C451 *87-018-132-019 CAP, CERA-SOL U 2200P-16 X
C453 *87-010-374-019 CAP, ELECT 47-10V
C457 *87-010-263-019 CAP, ELECT 100-10V

C459 *87-010-793-019 CAP, ELECT BP 0.47-50V SRA
C460 *87-015-684-019 CAP, ELECT 47-25V
C461 *87-015-684-019 CAP, ELECT 47-25V
C462 *87-010-263-019 CAP, ELECT 100-10V

C463 *87-010-374-019 CAP, ELECT 47-10V
C653 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F
C654 *87-018-209-019 CAP, CERA-SOL U 0.1-50 F
D301 *87-001-835-019 VARI-CAP, KV-1560(Y)

REF. NO.	PART NO.	DESCRIPTION
EMI1	*87-008-372-019	FILTER EMI BL OIRNI
EMI2	*87-008-372-019	FILTER EMI BL OIRNI
EMI3	*87-008-372-019	FILTER EMI BL OIRNI
EMI101	*87-008-372-019	FILTER EMI BL OIRNI
EMI102	*87-008-372-019	FILTER EMI BL OIRNI
EMI103	*87-008-372-019	FILTER EMI BL OIRNI
FL51	*89-VX5-616-010	FL 9-BT-656(DISPLAY)
△FR2	87-029-124-019	RES. FUSE 2. 2-1/4W
L101	*87-005-406-019	COIL CHOKE 560UH
L102	*87-005-406-019	COIL CHOKE 560UH
L103	*87-003-147-019	COIL CHOKE 22UH
L201	*87-003-147-019	COIL CHOKE 22UH
L301	*87-003-147-019	COIL CHOKE 22UH(Y)
L302	*81-692-626-019	COIL CHOKE VCO(Y)
L351	*87-003-147-019	COIL CHOKE 22UH(Y)
L451	*87-003-147-019	COIL CHOKE 22UH
R352	*87-025-426-019	RES. MF 22K-1/6W F
R353	*87-025-426-019	RES. MF 22K-1/6W F
SFR301	*87-024-169-019	SFR. 2. 2K(Y)
SFR401	*87-024-173-019	SFR. 22K
SFR402	*87-024-173-019	SFR. 22K
SFR403	*87-024-168-019	SFR. 1K
SFR451	*87-024-173-019	SFR. 22K
SFR452	*87-024-173-019	SFR. 22K
T51	*89-VX5-627-019	TRANSFORMER FL
TC301	*87-011-224-019	CAP. TRIMMER 30P(Y)
X201	*87-008-394-019	CERAMIC CST 4. 19MGW
X301	*89-VX5-623-019	CRYSTAL 15. 2MHZ(Y)
X351	*84-719-610-019	CRYSTAL 8. 4672MHZ
===FRONT CIRCUIT BOARD SECTION===		
SW501	87-036-142-019	TACT SW(5)
SW502	87-036-142-019	TACT SW(0)
SW503	87-036-142-019	TACT SW(+10)
SW504	87-036-142-019	TACT SW(RANDOM)
SW505	87-036-142-019	TACT SW(4)
SW506	87-036-142-019	TACT SW(9)
SW507	87-036-142-019	TACT SW(DELETE)
SW508	87-036-142-019	TACT SW(AUTO)
SW509	87-036-142-019	TACT SW(CONT)
SW510	87-036-142-019	TACT SW(3)
SW511	87-036-142-019	TACT SW(8)
SW512	87-036-142-019	TACT SW(PROGRAM/CHECK)

REF. NO.	PART NO.	DESCRIPTION
SW513	87-036-142-019	TACT SW(PLAY/REPLAY)
SW514	87-036-142-019	TACT SW(▶▶/▶▶)
SW515	87-036-142-019	TACT SW(2)
SW516	87-036-142-019	TACT SW(7)
SW517	87-036-142-019	TACT SW(REPEAT/BLANK)
SW518	87-036-142-019	TACT SW(PAUSE)
SW519	87-036-142-019	TACT SW(◀◀/◀◀)
SW520	87-036-142-019	TACT SW(1)
SW521	87-036-142-019	TACT SW(6)
SW522	87-036-142-019	TACT SW(DISPLAY)
SW523	87-036-142-019	TACT SW(STOP/CLEAR)
SW524	87-036-142-019	TACT SW(OPEN/CLOSE)

===SWITCH CIRCUIT BOARD SECTION===

SW551	87-036-087-019	SLIDE SW(TIMER)
SW552	87-036-142-019	TACT SW(POWER)

===MOTOR-1 CIRCUIT BOARD SECTION===

※PCB-D	91-625-848-119	MOTOR 1 C. B(RF-310T-11400)
※PCB-D	91-628-263-119	MOTOR 1 C. B(MDN-4RA3NTAS/4RA3ETA)
※M1	9X-264-077-019	MOTOR GEAR ASSY(SLED) (RF-310T-11400)
※M1	9X-264-134-419	MOTOR GEAR ASSY(SLED)(MDN-4RA3ETA)
※M2	9X-264-133-719	MOTOR ASSY(W/CHASSIS, T.T)(SPINDLE) (RF-310T-11400)
※M2	9X-264-134-819	MOTOR ASSY(W/CHASSIS, T.T)(SPINDLE) (MDN-4RA3NTAS)
SW1	91-570-822-219	LEAF SW(INSIDE LIMIT)

===MOTOR-2 CIRCUIT BOARD SECTION===

M3	9X-264-133-619	MOTOR ASSY(LOADING)
----	----------------	---------------------

===MISCELLANEOUS===

	98-848-046-519	PICK UP KSS-150A(H)(RP)
	*89-VT5-202-010	BUSHING, CORD
	89-VX5-618-010	FLAT CABLE 11P
SW2	91-571-312-119	LEAF SW(OPEN/CLOSE)

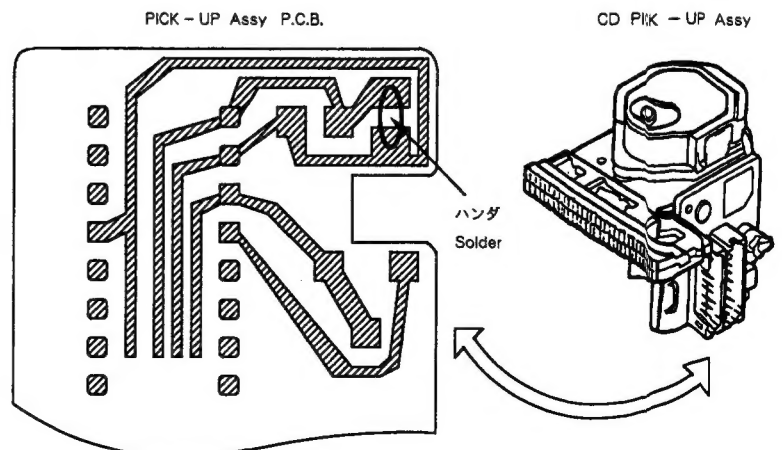
※Caution

Two Types of the spindle (DISC) motor and sled motor are used, but they are not compatible.
Check the part numbers (MDN, RF) on the labels of motors and replace motors with the same one.

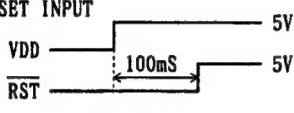
Precaution to replace Optical block (KSS - 150A)

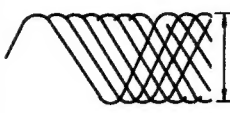
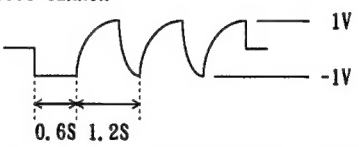
Body or clothes electrostatic potential could ruin laser diode in the optical block. Be sure ground body and workbench, and use care the clothes do not touch the diode.

- 1) After the connection, remove solder shown in figure below.



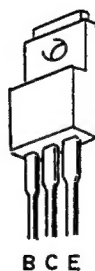
WAVE FORM VOLTAGE

SCHEMATIC DIAGRAM POINT	VOLTAGE, WAVEFORM
①	20V AC power supply voltage
②	3.4V AC filament voltage
③	-25.0V VFDP
④	-36.0V
⑤	12.0V +B
⑥	-13.0V -B
⑦ ⑧	5.4V } Base voltage of voltage -5.4V } regulator transistor
⑨ ⑩	4.8V } Regulated power -4.8V } supply voltage
⑪	5.0V Microcomputer power supply
⑫	RESET INPUT 
⑬	P-CONT INPUT ON 5.5V OFF(STANDBY) -0.2V
⑭	P-OFF OUTPUT ON 0V OFF(STANDBY) 4.8V
⑮	P-OFF (DISPLAY ON/OFF) ON 4.0V OFF -32V

SCHEMATIC DIAGRAM POINT	VOLTAGE, WAVEFORM
⑯	RF signal level  P-P 1.4±0.3V Vp-p should be approx. 1.5V, when playing TRACK 2 of YEDS-18.
⑰	VCO input 4V 0 Normally demultiplied output appears at CXD1135Q ⑰ pin.
⑱	VCO LPF OUT In play mode this voltage moves with in 0 ± 0.5V DC.
⑲	DAC I/V OUT 0dB test disc: 1.6V 1.45V(Min)~2.15V(Max)(tolerance)
⑳	EMP, H-EMP ON 3.6V OFF -5.6V
㉑	AUDIO MUTE ON 4.2V OFF -5.6V
㉒	FOCUS SEARCH 



2SA1015
2SA1296
2SC1815
2SC2001

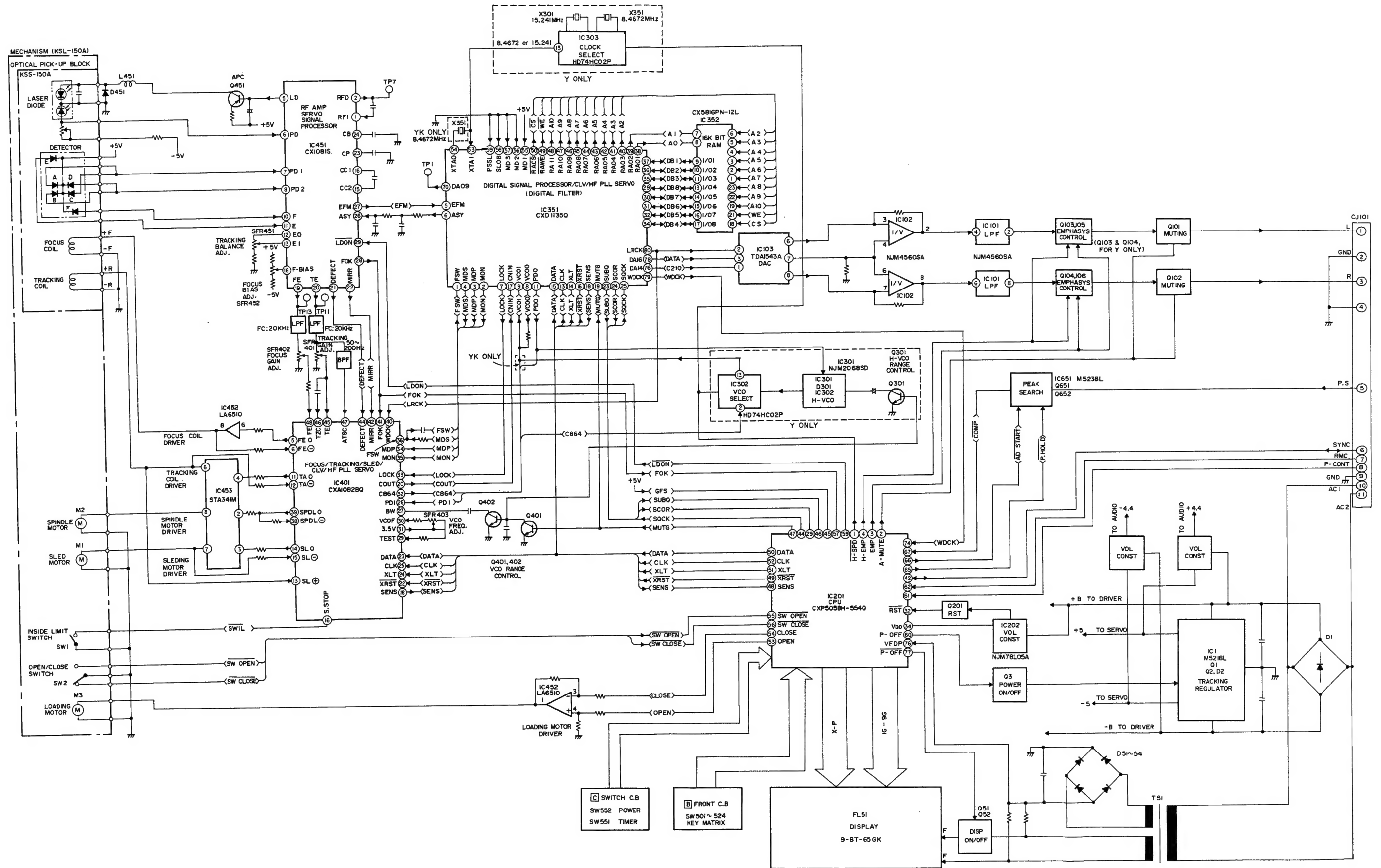


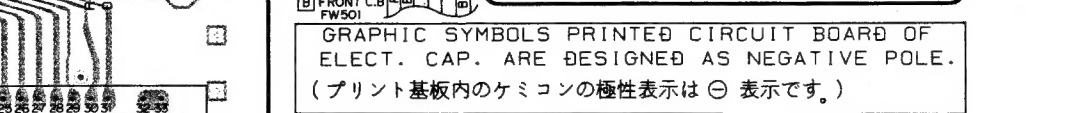
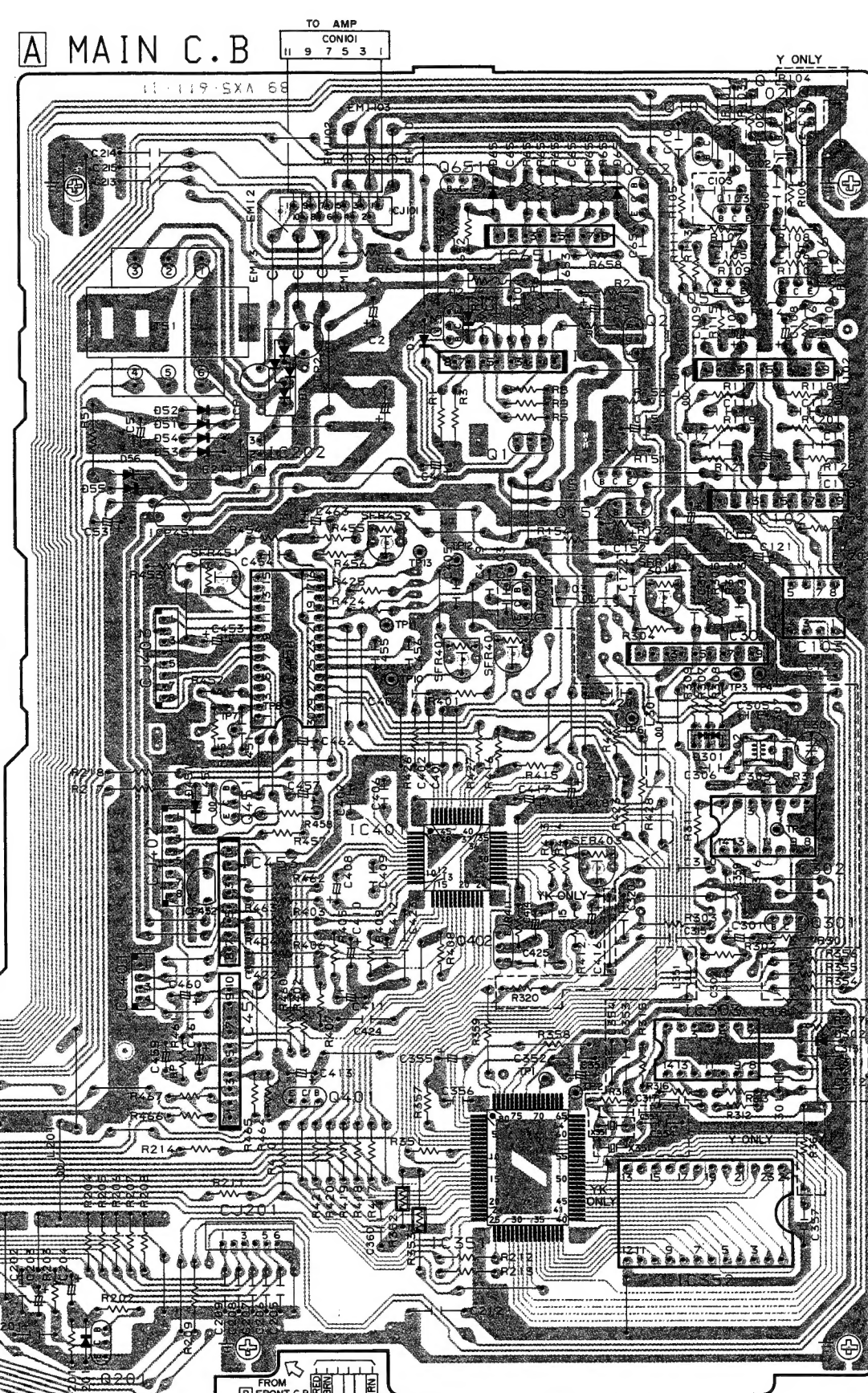
2SB1370
2SD2061



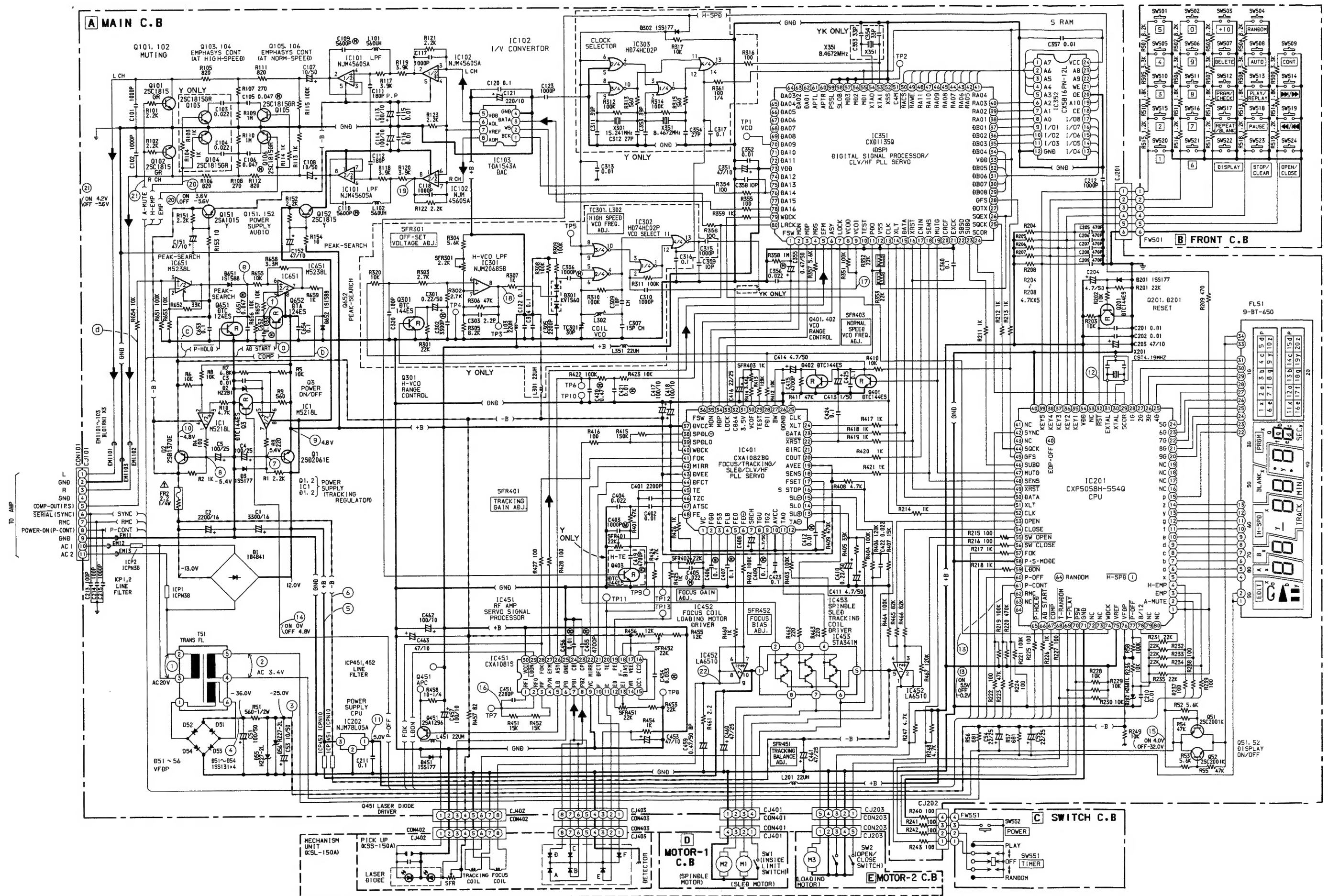
DTA124
DTC124
DTC144

BLOCK DIAGRAM

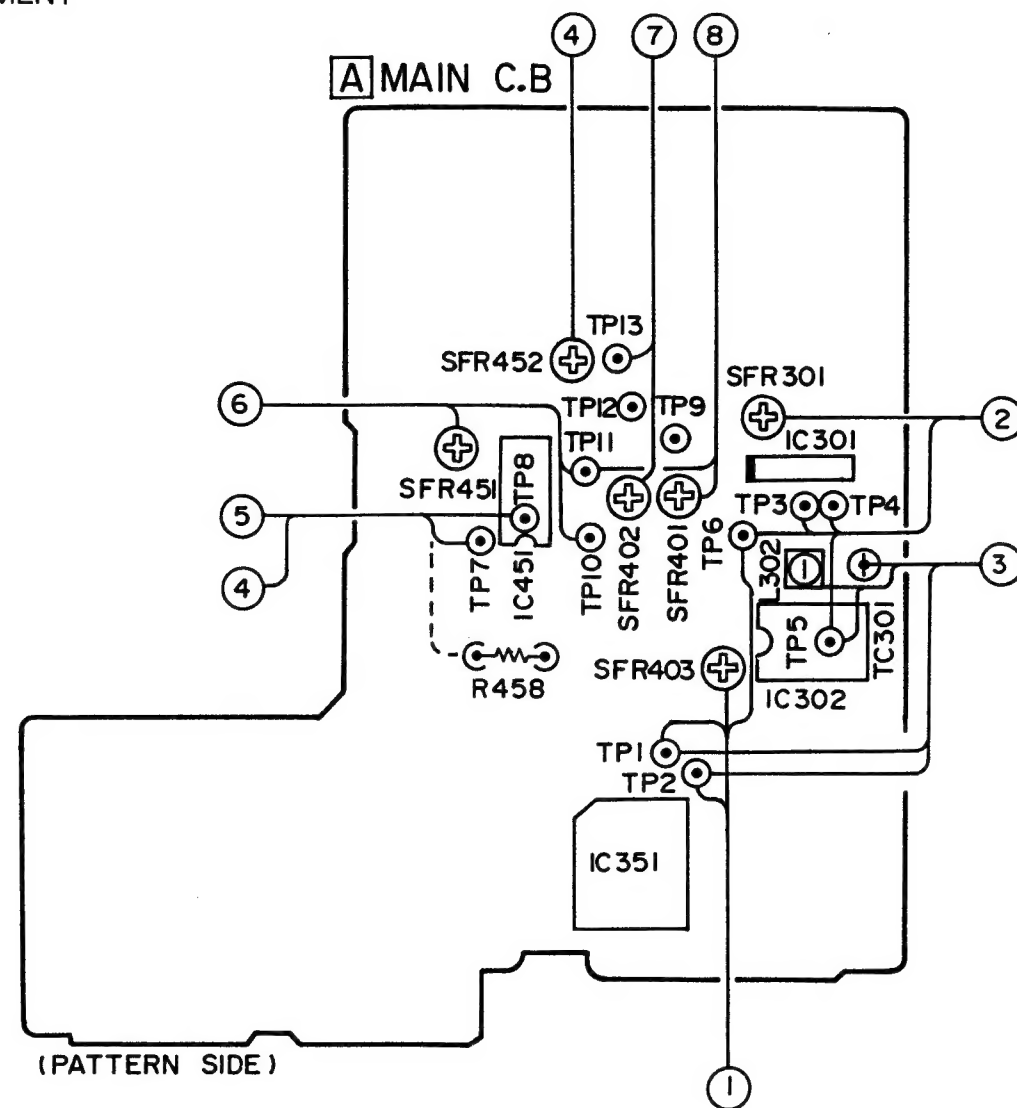




SCHEMATIC DIAGRAM



ADJUSTMENT



Note: Connect probe(10:1) of frequency counter and oscilloscope to test point.

① Normal Speed VCO Frequency Adjustment

1. Open the tray by pressing the OPEN/CLOSE button.
2. Short between test points TP6 (ASY) and TP4 (GND) using a short lead wire.
3. Connect the frequency counter to TP1 (VCO) and TP2 (GND).
4. Adjust SFR403(VCO) so that the frequency counter reading is 4.10 ± 0.02 MHz.
5. After this adjustment, remove the short lead wire from TP6 (ASY) and TP4 (GND).

② Offset Voltage Adjustment

1. Connect a voltmeter to TP3 (PLLV) and TP4 (GND).
2. Turn the power switch on.
3. Open the tray by pressing the OPEN/CLOSE button.
4. Short between test points TP6 (ASY) and TP4 (GND) using a short lead wire. Also, short TP5 (H-SPD) and TP4 (GND).

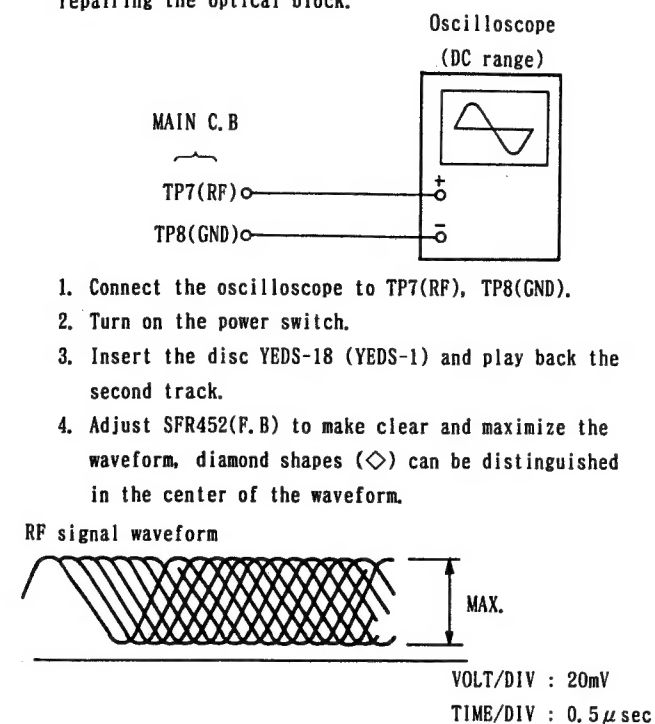
5. Adjust SFR301 so that the voltages at TP3 (PLLV) and TP4 (GND) are 0 ± 0.05 V.
6. After this adjustment, remove the short lead wire from TP6 (ASY) and TP5 (H-SPD).

③ High Speed VCO Frequency Adjustment (Y model only)

1. Put the unit in high speed mode by turning the power on while pressing the RANDOM and REPEAT/BLANK buttons.
2. Open the tray by pressing the OPEN/CLOSE button.
3. Short between test points TP6 (ASY) and TP4 (GND) using a short lead wire. Also, short TP5 (H-SPD) and TP4 (GND).
4. Connect the frequency counter to TP1 (VCO) and TP2 (GND).
5. Adjust TC301 so that the frequency counter reading is 7.82 ± 0.005 MHz. If this specified value is not met, readjust using L302.
6. Turn the power off.
7. Check that the frequency in the normal speed adjustment is correct.
8. After this adjustment, remove the short lead wire from TP6 (ASY) and TP5 (H-SPD).

④ Focus Bias Adjustment

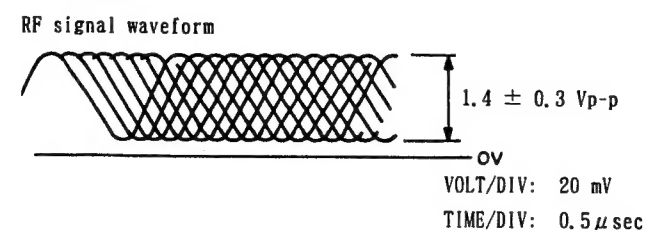
Make the focus bias adjustment when replacing and repairing the optical block.



⑤ RF Waveform Check

This check should be performed whenever the optical system block is replaced.

1. Connect the oscilloscope to TP7 (RF) and TP8 (GND).
2. Turn the power switch on.
3. Insert the disc YEDS-18 (YEDS-1) and play back the data on the second track.
4. Adjust SFR on the pickup board so that a waveform appears in the oscilloscope as shown in the figure below.

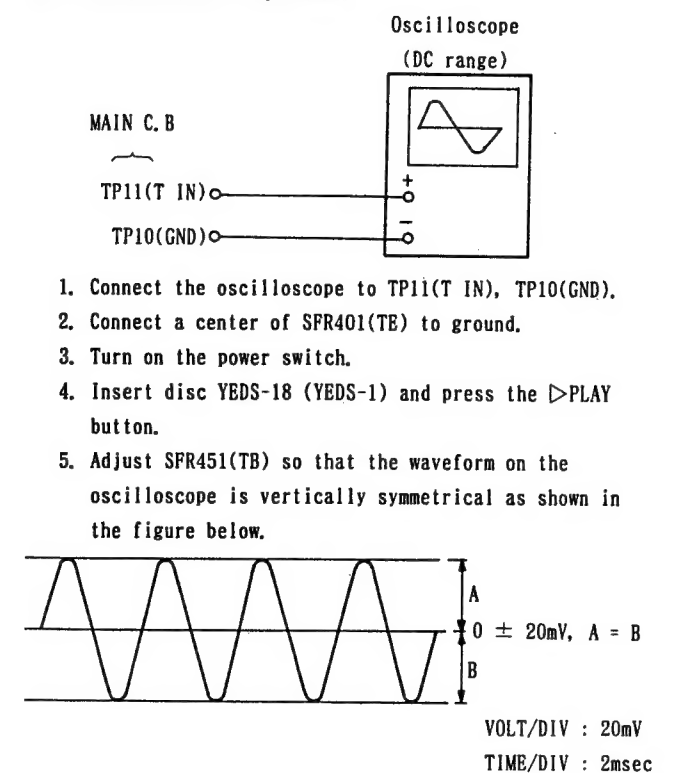


Note: The current of the laser signal can be checked by checking the voltage across R458(10Ω). The specified current value is shown on the label of the pickup. The difference should be ± 6.0 mA.

KSS-150A
15Y98
K464 46.4 mA

$$\text{Laser current } I_{op} = \frac{\text{Voltage across R458}}{10\Omega}$$

⑥ Tracking Balance Adjustment



1. Connect the oscilloscope to TP11(T IN), TP10(GND).
2. Connect a center of SFR401(TE) to ground.
3. Turn on the power switch.
4. Insert disc YEDS-18 (YEDS-1) and press the ▷PLAY button.
5. Adjust SFR451(TB) so that the waveform on the oscilloscope is vertically symmetrical as shown in the figure below.

6. After adjustment is completed, remove the ground lead wire.

⑦⑧ Focus/Tracking Gain Adjustment

A frequency response analyzer is necessary in order to perform this adjustment exactly. However, this gain has a margin, so even if it is slightly off, there is no problem. Therefore, do not perform this adjustment. Focus/tracking gain determines the pick-up follow-up (vertical and horizontal) relative mechanical noise and mechanical shock when 2-axis device operate. However, as these reciprocate, the adjustment is at the point where both are satisfied.

- When gain is raised, the noise when the 2-axis device operates increases.
- When gain is lowered, it is more susceptible to mechanical shock and skipping occurs more easily.
- When gain adjustment is off, the symptoms below appear.

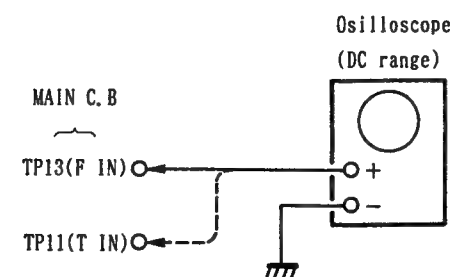
Symptoms \ Gain	Focus	Tracking
<ul style="list-style-type: none"> The time until music starts becomes longer for STOP → PLAY or automatic selection (⏮, ⏭ buttons pressed.) (Normally takes about 2 seconds.) 	low	low or high
<ul style="list-style-type: none"> Music does not start and disc continues to rotate for STOP → PLAY or automatic selection (⏮, ⏭ buttons pressed.) 	—	low
<ul style="list-style-type: none"> Disc table opens shortly after STOP → PLAY. 	low or high	—
<ul style="list-style-type: none"> Sound is interrupted during PLAY. Or time counter display stops progressing. 	—	low
<ul style="list-style-type: none"> More noise during 2-axis device operation. 	high	high

The following is a simple adjustment method.

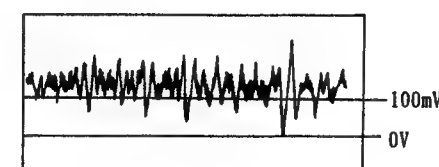
— Simple Adjustment —

Note : Since exact adjustment cannot be performed, remember the positions of the controls before performing the adjustment. If the positions after the simple adjustment are only a little different, return the controls to the original position.

Procedure :



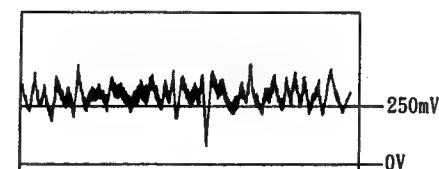
1. Keep the set horizontal.
If the set is not horizontal, this adjustment cannot be performed due to the gravity against the 2-axis device.
2. Insert a disc YEDS-18 (YEDS-1) and play back the second track.
3. Connect an oscilloscope to Main circuit board TP13(F IN)
4. Adjustment SFR402 (FE) so that the waveform is as shown in the figure below. (focus gain adjustment)



VOLT/DIV : 10mV
TIME/DIV : 2mS

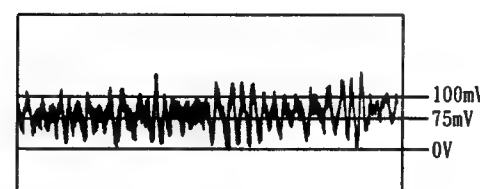
- Incorrect Examples (DC level changes more than on-adjusted waveform)

low focus gain



VOLT/DIV : 10mV
TIME/DIV : 2mS

high focus gain



VOLT/DIV : 10mV
TIME/DIV : 2mS

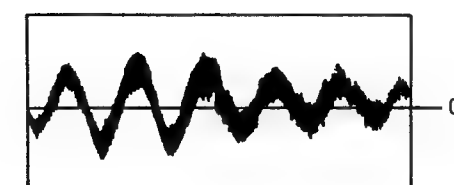
5. Connect oscilloscope to Main circuit board TP11(T IN)
6. Adjust SFR401 (TE) so that the waveform is as shown in the figure below. (tracking gain adjustment)



VOLT/DIV : 50mV
TIME/DIV : 2mS

- Incorrect Example (fundamental wave appears)

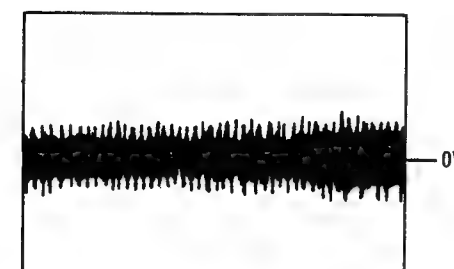
low tracking gain



VOLT/DIV : 50mV
TIME/DIV : 2mS

high tracking gain

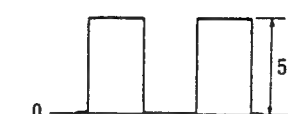
(higher fundamental wave than for low gain)



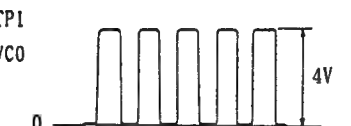
VOLT/DIV : 50mV
TIME/DIV : 2mS

WAVE FORM

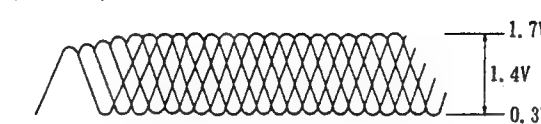
CXD1135
WDCK
IC351, ⑦ 0.2V/DIV
2μS/DIV
f=88.2kHz



IC351 TP1
⑦ VC0 0.2V/DIV
0.2μS/DIV
f=4.0 MHz



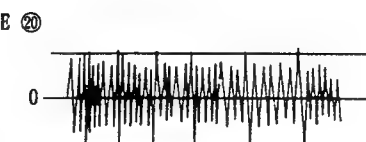
IC451, TP7(RF)
② 1.7V
1.4V
0.3V
20mV/DIV
0.5μS/DIV



IC451 FE ⑩ 15mV x 10
20mV/DIV
2mS/DIV

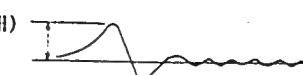


IC451 TE ⑪ 50mV/DIV
1mS/DIV



TP13(F IN)

① (at FOCUS SEARCH)
≈ 1.5(V)



PRACTICAL SERVICE FIGURE

Output level : 1.4 ± 0.2V
(TR - 2.1kHz)
Distortion : Less than 0.06 %
Frequency response : 0 ± 2dB
(TR - 3,4,5,6) (20Hz,100Hz,10kHz,20kHz)

IC DESCRIPTION

For the description of pins as shown below, see the manual of the XC-002.		
	DX-D91	XC-002
①	IC, CXA1082BQ	IC, CXA1082S
②	IC, CXA1081S	IC, CXA1081S

IC, CXP5058H-554Q

Pin No.	Pin Name	I/O	Description
1	H-SPD	O	Low in high-speed mode.
2	A-MUTE		Analog mute output. High when emphasis is on.
3	EMPH		Emphasis switching output. High when emphasis is on.
4	H-EMPH		High when emphasis is on and in high-speed mode.
5	x	O	Display segment output.
6	a		
7	b		
8	c		
9	d		
10	e		
11	f		
12	g		
13	y		
14	z		
15	p		
16	NC	—	Reserved.
17	NC		
18	NC		
19	NC		
20	9G	O	Display grid scan output.
21	8G		
22	7G		
23	6G		
24	5G		
25	4G		
26	3G		
27	2G		
28	1G		
29	SCOR	I	Sub-code S0 + S1 input interrupt at the leading edge.
30	XTAL	—	Connected to the ceramic oscillator. 4.19 MHz
31	EXTAL	I	
32	RST	I	Reset input.
33	NC	—	Reserved.
34	VDD	—	Power input terminal. Connected to +B.

Pin No.	Pin Name	I/O	Description
35	KEY1	I	KEY input.
36	KEY2		
37	KEY3		
38	KEY4		
39	KEY5		
40	EOP-0FF	—	Connected to GND.
41	NC	—	Reserved.
42	SYNC	I/O	Sync. signal to other components input or output. (8-bit serial)
43	NC	—	Reserved.
44	SQCK	I	Sub-code Q read and clock input.
45	GFS		Display signal input for frame sync. lock status.
46	SUBQ		Sub-code Q input.
47	MUTG	O	Muting output to DSP.
48	SENS	I	Connected to DSP SENS terminal.
49	XRST	O	System reset output.
50	DATA	O	Serial data output to DSP.
51	XLT	O	Data latch output.
52	CLK		Data transmission clock.
53	OPEN		Tray open output. High when opening.
54	CLOSE		Tray close output. High when closing.
55	SW OPEN	I	Tray open detection switch. Low when the tray is open.
56	SW CLOSE		Tray open detection switch. Low when the tray is closed.
57	FOK		Indicates the status of focus. High when in focus.
58	P-S MODE		P-S 1 mode: High when peak search is performed every recording. P-S 2 mode: Low when if the disc has not been changed and the program has not been revised, only the peak point is played back.
59	LDON	O	Laser diode ON/OFF output. High when the laser diode is on.
60	P-0FF	O	System ON/OFF output. High when power is off.
61	P-CONT	I	System ON/OFF output from other components.
62	RMC	I	42-bit serial remote control input.
63	NC	—	Reserved.
64	RANDOM	O	Indicates random play operation. High in random mode. (Reserved)
65	P-HOLD		Holds the peak of input signal from other components in the peak search mode. High when peak search mode.
66	AD START		Initial signal and AD START pulse output to the A/D conversion circuit.
67	COMP	I	Timing signal input for A/D conversion.
68	T-RANDOM		Random switch input. Low during random play and timer random play.
69	T-PLAY		Timer play mode switch input. Low in timer play mode.
70	PSW		Power switch input. ON/OFF (STANDBY) is switched.
71	GND	—	Connected to GND.
72	NC	—	Reserved.
73	NC	—	Reserved.
74	WDCK	I	Reference clock input for the peak search (AD conversion circuit)
75	VREF	—	Connected to +B.
76	VFDP	—	Power input for FL tube display output. Connected to -B.

Pin No.	Pin Name	I/O	Description
77	$\overline{P-OFF}$	O	Low when power is off.
78	8/12		High when the play time of the disc is less than 23 minutes.
79	NC	—	Reserved.
80	NC	—	Reserved.

IC, CXD1135Q

Pin No.	Pin Name	I/O	Description
1	FSW	O	Output to switch the time constant of the spindle motor output filter.
2	MON	O	Spindle motor on/off control output.
3	MDP	O	Spindle motor drive output. Coarse control in the CLV. S mode and phase control in the CLV. P mode.
4	MDS	O	Spindle motor drive output. Speed control in the CLV. S mode.
5	EFM	I	Inputs an EFM signal from the RF amplifier.
6	ASY	O	Output to control the slice level of the EFM signal.
7	LOCK	O	The GFS signal is sampled by the WFCK/16. When the GFS signal is "H", this pin outputs "H", and when the signal is "L" 8 times continuously, it outputs "L".
8	VCOO	O	VCO output. When this is locked to the EFM signal. $f=8.6436\text{MHz}$
9	VCOI	I	VCO input
10	TEST	I	Connected to GND.
11	PDO	O	Phase comparison output between the EFM signal and $VCO/2$.
12	VSS	—	GND (0V)
13	CLK	I	Inputs a clock signal for the serial data transfer from CPU. Latches data at the rise of the clock signal.
14	XLT	I	Latch input from CPU. Latches 8 bit shift register data (serial data from CPU) to each register.
15	DATA	I	Inputs serial data from CPU.
16	XRST	I	System reset input. The system is reset at "L" input.
17	CNIN	I	Tracking pulse input.
18	SENSE	O	Outputs the internal state according to the address.
19	MUTG	I	Muting input. When the ATTM in the internal register is "L", the system is in the normal state if the MUTG is "L" and the sound is muted if the MUTG is "H".
20	CRCF	O	Outputs the CRC checking result of sub-code Q. (Reserved)
21	EXCK	I	Clock input for the sub-code serial output. Connected to GND.
22	SBSO	O	Sub-code serial output. (Reserved)
23	SUBQ	O	Sub-code Q output.
24	SCOR	O	Sub-code sync S0 + S1 output.

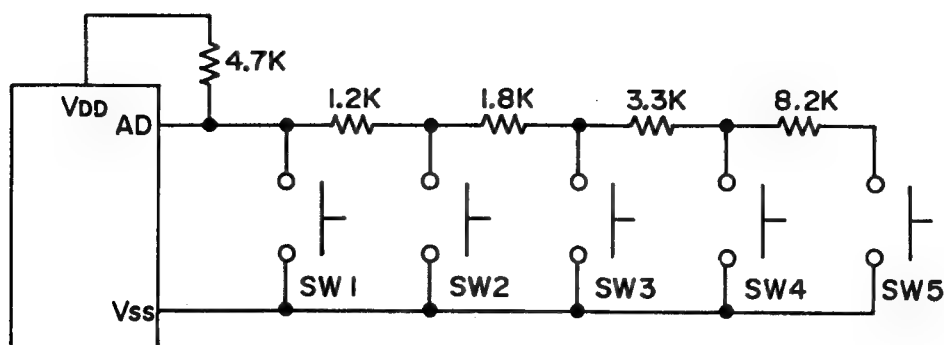
Pin No.	Pin Name	I/O	Description
25	SQCK	I/O	Clock signal for reading of sub-code Q.
26	SQEX	I	SQCK select input. Connect to VDD.
27	DOTX	O	Digital Audio interface output ($\overline{\text{WFCK}}$ is output when being off). (Reserved)
28	GFS	O	Output of the frame sync locking state. Goes "H" when locked.
29	DB 8	I/O	Data pin of the external RAM. DATA 8 (MSB)
30	DB 7	I/O	Data pin of the external RAM. DATA 7
31	DB 6	I/O	Data pin of the external RAM. DATA 6
32	DB 5	I/O	Data pin of the external RAM. DATA 5
33	VDD	—	Power supply (+5 V).
34	DB 4	I/O	Data pin of the external RAM. DATA 4
35	DB 3	I/O	Data pin of the external RAM. DATA 3
36	DB 2	I/O	Data pin of the external RAM. DATA 2
37	DB 1	I/O	Data pin of the external RAM. DATA 1 (LSB)
38	RA 1	O	Address output of the external RAM. ADDR 0 (LSB)
39	RA 2	O	Address output of the external RAM. ADDR 1
40	RA 3	O	Address output of the external RAM. ADDR 2
41	RA 4	O	Address output of the external RAM. ADDR 3
42	RA 5	O	Address output of the external RAM. ADDR 4
43	RA 6	O	Address output of the external RAM. ADDR 5
44	RA 7	O	Address output of the external RAM. ADDR 6
45	RA 8	O	Address output of the external RAM. ADDR 7
46	RA 9	O	Address output of the external RAM. ADDR 8
47	RA 10	O	Address output of the external RAM. ADDR 9
48	RA 11	O	Address output of the external RAM. ADDR 10 (MSB)
49	$\overline{\text{RAWE}}$	O	Outputs the WRITE ENABLE signal to the external RAM (active at "L").
50	$\overline{\text{RACS}}$	O	Outputs the CHIP SELECT signal to the external RAM (active at "L").
51	C 4M	O	1/2 division output of the crystal oscillator. $f=4.2336\text{MHz}$ (Reserved)
52	VSS	—	Connect to GND.
53	XTA I	I	Crystal oscillator input. $f=8.4672\text{MHz}$
54	XTA O	O	Crystal oscillator output. $f=8.4672\text{MHz}$ (Reserved)
55	MD 1	I	<div> <div>Mode select input 1 used at "H"</div> <div>Mode select input 2 used at "L" Connected to GND.</div> <div>Mode select input 3 used at "L" Connected to GND.</div> </div> <div> <div>Used in the mode with the clock frequency 8.4672MHz, the digital output OFF, the digital filter ON</div> </div>
56	MD 2	I	
57	MD 3	I	
58	SLOB	I	Input to switch the code of the audio data output. "L" causes the 2 second complement output and "H" causes the offset binary output. Connected to GND.
59	PSSL	I	Input to switch the mode of the audio data output. "L" causes serial output and "H" causes parallel output. Connected to GND.

Pin No.	Pin Name	I/O	Description
60	APTR	O	Aperture correction control output. 44.1 kHz with the filter OFF. (Reserved)
61	APTL	O	Aperture correction control output. 44.1 kHz with the filter OFF. (Reserved)
62	DA1	O	DA1 (LSB of parallel audio data) output with PSSL="H". C1F1 output with PSSL="L". (Reserved)
63	DA2	O	DA2 output with PSSL="H". C1F2 output with PSSL="L". (Reserved)
64	DA3	O	DA3 output with PSSL="H". C2F1 output with PSSL="L". (Reserved)
65	DA4	O	DA4 output with PSSL="H". C2F2 output with PSSL="L". (Reserved)
66	DA5	O	DA5 output with PSSL="H". C2FL output with PSSL="L". (Reserved)
67	DA6	O	DA6 output with PSSL="H". C2PO output with PSSL="L". (Reserved)
68	DA7	O	DA7 output with PSSL="H". RFCK output with PSSL="L". (Reserved)
69	DA8	O	DA8 output with PSSL="H". WFCK output with PSSL="L". (Reserved)
70	DA9	O	DA9 output with PSSL="H". PLCK output with PSSL="L". (Note 1)(Reserved)
71	DA10	O	DA10 output with PSSL="H". UGFS output with PSSL="L". (Reserved)
72	DA11	O	DA11 output with PSSL="H". GTOP output with PSSL="L". (Reserved)
73	VDD	—	Power supply (+5 V)
74	DA12	O	DA12 output with PSSL="H". RA0V output with PSSL="L". (Reserved)
75	DA13	O	DA13 output with PSSL="H". C4LR output with PSSL="L". (Reserved)
76	DA14	O	DA14 output with PSSL="H". C210 output with PSSL="L". (Note 2)
77	DA15	O	DA15 output with PSSL="H". C210 output with PSSL="L". (Reserved)
78	DA16	O	DA16 (MSB of parallel audio data) output with PSSL="H". DATA output with PSSL="L". (Note 3)
79	WDCK	O	Strobe signal output. 88.2 kHz with the filter OFF.
80	LRCK	O	Strobe signal output. 44.1 kHz with the filter OFF.

Note 1) PLCK: VCO/2 output. When locked to the EFM signal, f=4.3218MHz

Note 2) C210: Bit clock signal. f=2.1168MHz

Note 3) DATA: Audio signal serial data output



KEY MATRIX

VOLTAGE (V) PIN	0 ~ 0.33 (SW1)	0.82 ~ 1.29 (SW2)	1.78 ~ 2.21 (SW3)	2.69 ~ 3.06 (SW4)	3.56 ~ 4.06 (SW5)
FW501①	1	2	3	4	5
FW501②	6	7	8	9	0
FW501③	DISPLAY	REPEAT /BLANK	PROGRAM /CHECK	DELETE	+ 1 0
FW501④	STOP /CLEAR	PAUSE	PLAY /REPLAY	AUTO	RANDOM
FW501⑤	OPEN /CLOSE	F-BWD /B-SKIP	F-FWD /F-SKIP	CONT.	—

KEY SWITCH INPUT VOLTAGE

ANALOG INPUT VOLTAGE	CONDITION	DIGITAL VALUE
0.0 ~ 0.33V	VDD 5V	000
0.82 ~ 1.29V		001
1.78 ~ 2.21V		010
2.69 ~ 3.06V		011
3.56 ~ 4.06V		100
4.62 ~ 5.0V		101

PEAK SEARCH CIRCUIT

② AD START



⑤ COMP



Input signals coming from ④ are amplified by IC651 (1/2) and are peak hold at ⑥. The voltage of ⑥ is discharged through R657 at the leading edge of AD START ②. When the voltage of ⑥ is lower than that of ⑤, the output signals of IC651 (2/2) are inverted. The smaller the number of WDCK signals input to pin ④ of IC201 from the leading edge of AD START to the trailing edge of COMP, the greater the peak is judged to be. That point is then recorded. The P-HOLD signals are discharged whenever the voltage of the peak hold circuit is measured.

③ P-HOLD



④ Sound signal/ Rectification input



⑥ P-HOLD



⑦ Discharge



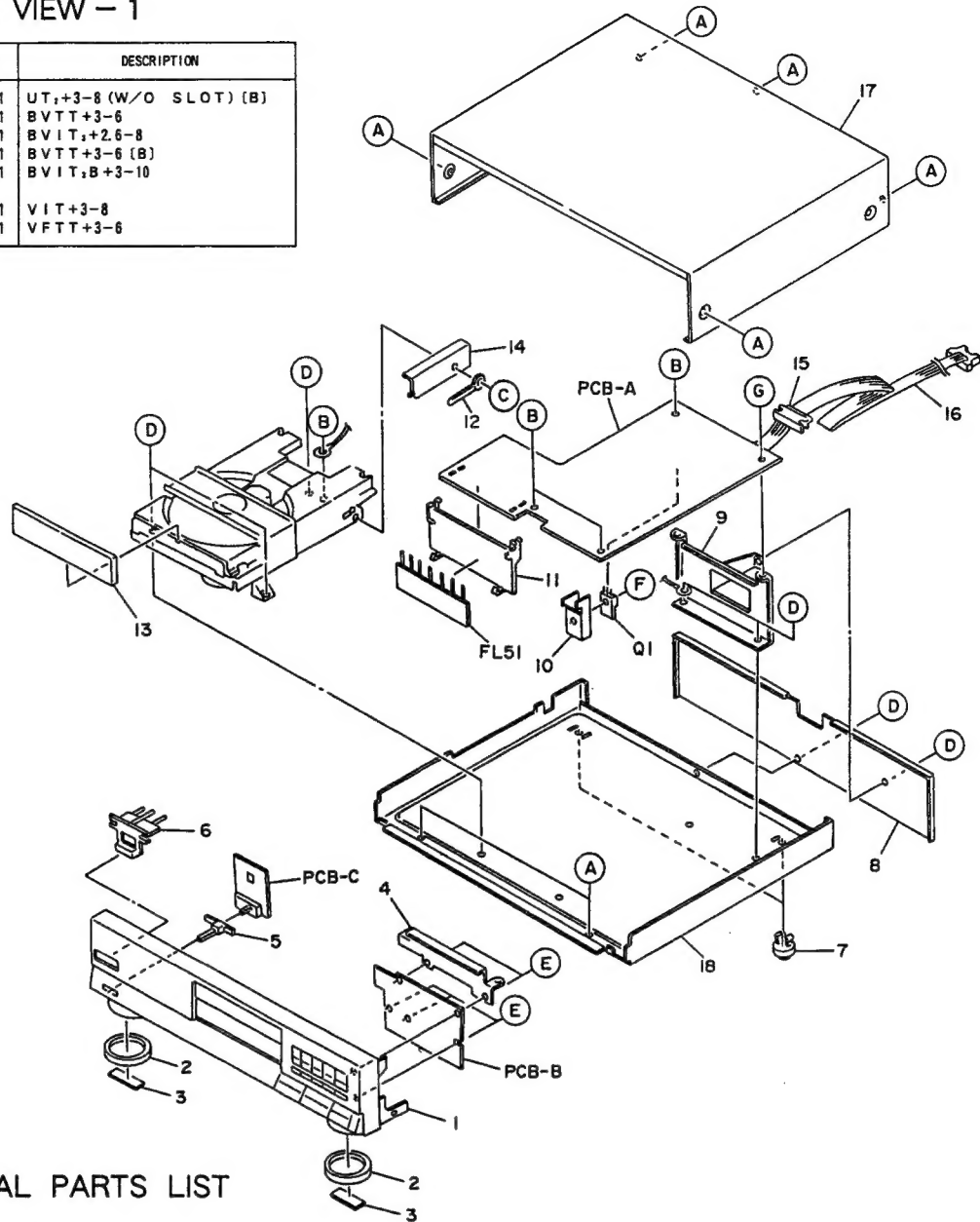
⑥

⑤

Discharge when P-HOLD is 'H'.

EXPLODED VIEW - 1

REF. NO.	PART NO.	DESCRIPTION
A	87-743-095-41	UT ₁ +3-8 (W/O SLOT) (B)
B	87-067-688-01	BVTT+3-6
C	87-067-686-01	BVIT ₁ +2.6-8
D	87-067-716-01	BVTT+3-6 (B)
E	87-067-680-01	BVIT ₁ B+3-10
F	87-571-095-41	VIT+3-8
G	87-067-566-01	VFTT+3-6

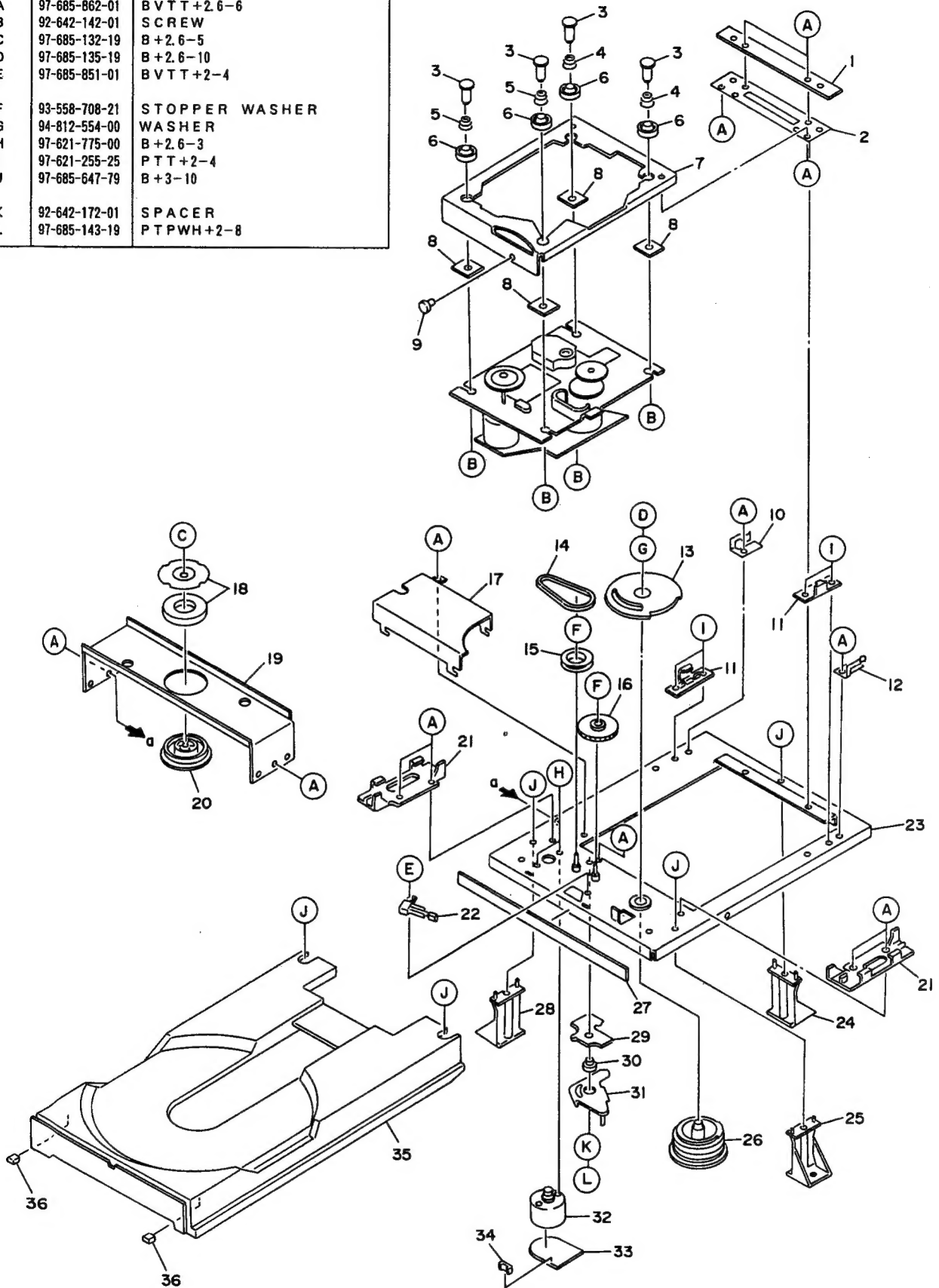


MECHANICAL PARTS LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1-1	★89-057-061-010	FRONT CABINET ASSY	※	1
	1-2	★89-VW5-005-010	RING, FOOT		2
	1-3	★89-VW5-212-010	FELT, FOOT (YN, YJ)		2
	1-3	★89-VW5-212-019	FELT, FOOT (YK, YNE)		2
	1-4	---	HOLDER, P.C.B		1
	1-5	★89-VX5-004-019	KNOB, SL TIMER	※	1
	1-6	★89-VP5-011-019	BUTTON, POWER		1
	1-7	★87-085-213-019	FOOT, H12.5		2
	1-8	★89-VX5-015-019	PANEL, REAR (YN)	※	1
	1-8	★89-VX5-019-019	PANEL, REAR (YJ)	※	1
	1-8	★89-VX5-020-019	PANEL, REAR (YK, YNE)	※	1
	1-9	---	HOLDER, CENTER		1
	1-10	---	HEAT SINK CT		1
	1-11	89-VX5-202-019	GUIDE, FL	※	1
	1-12	---	WIRE BINDER		1
	1-13	★89-VX5-010-019	PANEL, TRAY	※	1
	1-14	---	HOLDER, MECHANISM		1
	1-15	89-VT5-202-010	BUSHING, CORD		1
	1-16	---	FLAT CABLE 11P FG		1
	1-17	★89-VX5-003-019	CABINET, STEEL	※	1
	1-18	---	CHASSIS, MAIN		1

EXPLODED VIEW - 2

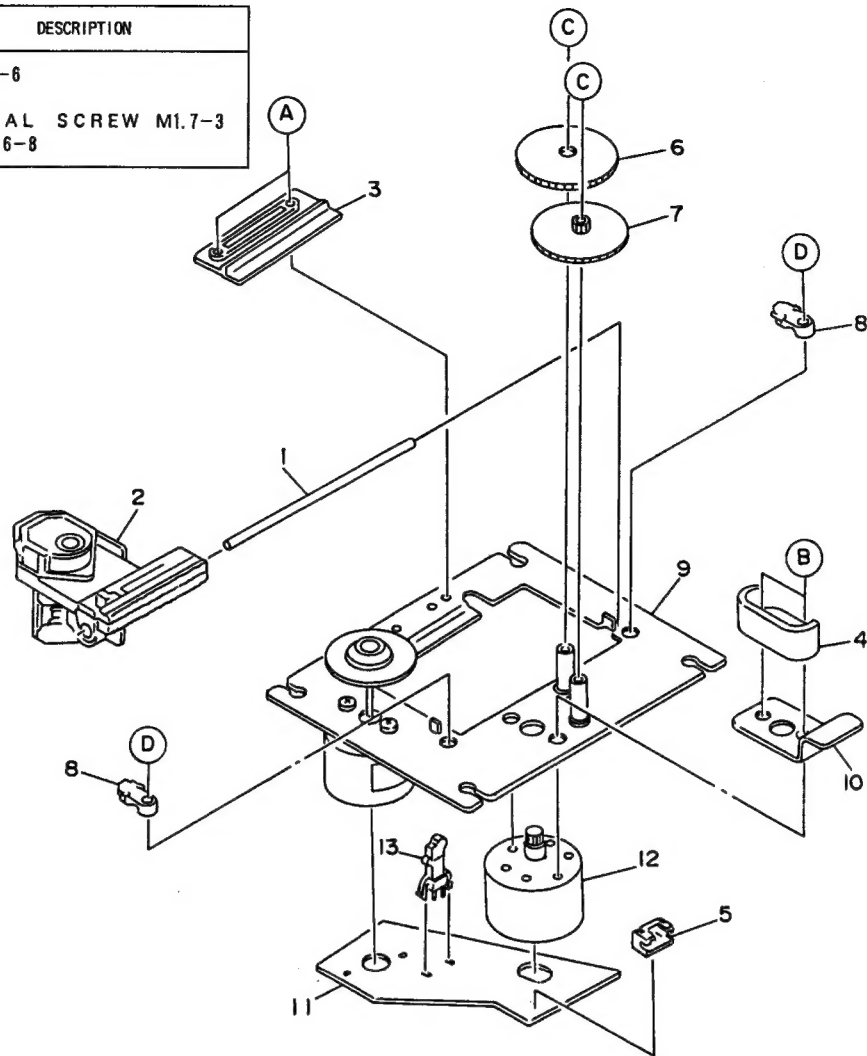
REF. NO.	PART NO.	DESCRIPTION
A	97-685-862-01	BVTT+2.6-6
B	92-642-142-01	SCREW
C	97-685-132-19	B+2.6-5
D	97-685-135-19	B+2.6-10
E	97-685-851-01	BVTT+2-4
F	93-558-708-21	STOPPER WASHER
G	94-812-554-00	WASHER
H	97-621-775-00	B+2.6-3
I	97-621-255-25	PTT+2-4
J	97-685-647-79	B+3-10
K	92-642-172-01	SPACER
L	97-685-143-19	PTPWH+2-8



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q' TY
	2-1	★92-642-170-010	HOLDER, HING		1
	2-2	★92-642-164-010	SPRING, HING		1
	2-3	★92-642-160-010	SHAFT, SPRING T		4
	2-4	★92-642-137-010	SPRING, COIL B		2
	2-5	★92-642-139-010	SPRING, COIL A		2
	2-6	★92-642-158-010	FOOT C		4
	2-7	★9X-264-210-510	SPRING SUB CHASSIS ASSY		1
	2-8	★92-642-159-010	PLATE, SPRING T		4
	2-9	★92-642-169-010	ROLLER		1
	2-10	★92-642-147-010	GUIDE, TRAY L		1
	2-11	★92-642-162-020	HOLDER, TRAY		2
	2-12	★92-642-146-010	GUIDE, TRAY R		1
	2-13	★92-642-154-020	GEAR, SPRING DRIVE		1
	2-14	93-653-387-000	LM BELT		1
	2-15	★94-913-731-010	PULLEY, ROADING		1
	2-16	★92-642-148-010	GEAR, SPRING RELAY		1
	2-17	★92-642-149-010	COVER, SPRING GEAR		1
	2-18	91-452-507-110	MAGNET ASSY		1
	2-19	★92-642-165-010	CHUCK CHASSIS		1
	2-20	★92-642-432-010	CHUCKING PULLEY		1
	2-21	★92-642-161-010	HOLDER, FRONT TRAY		2
	2-22	91-571-312-110	LEAF SWITCH (OPEN/CLOSE)		1
	2-23	★9X-264-210-610	SPRING MAIN CHASSIS ASSY		1
	2-24	★92-642-512-010	MD HOLDER BOSS REAR		1
	2-25	★92-642-510-010	MD HOLDER BOSS		1
	2-26	★92-642-153-010	CAM, SPRING CONTROL		1
	2-27	★92-642-157-030	TAPE, FRONT		1
	2-28	★92-642-511-010	MD HOLDER BOSS L		1
	2-29	★92-642-173-010	PLATE, RING		1
	2-30	★92-642-133-020	BOSS		1
	2-31	★9X-264-210-710	STOPPER RING ASSY		1
	2-32	9X-264-133-610	MOTOR ASSY (LOADING)		1
	2-33	★91-624-793-210	CD MOTOR 2 C.B		1
	2-34	★91-564-721-110	CONNECTOR PIN 5P		1
	2-35	★92-642-156-010	TRAY		1
	2-36	★92-642-125-010	DAMPER		2

EXPLODED VIEW - 3

REF. NO.	PART NO.	DESCRIPTION
A	92-642-144-01	PTT+2-6
B	97-621-255-35	P+2-5
C	93-303-809-31	SPECIAL SCREW M1.7-3
D	92-641-447-01	STP+2.6-8



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	3-1	★94-910-431-010	SHAFT, SLIDE		1
	3-2	98-848-046-510	PICK UP (KSS-150AHRP)		1
	3-3	★92-641-443-010	HOLDER, SLIDE		1
	3-4	★92-641-434-010	COVER, GEAR		1
	3-5	★92-564-720-110	CONNECTOR PIN		1
	3-6	9X-264-076-910	GEAR A		1
	3-7	★92-641-403-050	GEAR B		1
	3-8	★92-641-448-020	CLUMP, SHAFT		2
	※ 3-9	9X-264-133-710	SP MOTOR ASSY (W/CHASSIS, T.T) (DISC) (RF-310T-11400)		1
	※ 3-9	9X-264-134-810	SP MOTOR ASSY (W/CHASSIS, T.T) (DISC) (MDN-4RA3NTAS)		1
	3-10	★92-641-371-010	STOPPER		1
	※ 3-11	★91-625-848-110	CD MOTOR 1 C.B (RF-310T-11400)		1
	※ 3-11	★91-628-263-110	CD MOTOR 1 C.B (MDN-4RA3NTAS/4RA3ETA)		1
	※ 3-12	9X-264-077-010	SLED MOTOR GEAR ASSY (SLED) (RF-310T-11400)		1
	※ 3-12	9X-264-134-410	SLED MOTOR GEAR ASSY (SLED) (MDN-4RA3ETA)		1
	3-13	91-570-822-210	LEAF SWITCH (LIMIT)		1

※Caution

Two types of the spindle (DISC) motor and sled motor are used, but they are not compatible.
Check the part numbers (MDN ..., RF ...) on the labels of motors and replace motors with the same one.